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EXAMINER	
ROBERTS, JESSICA M	

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2621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/817,217	**Applicant(s)** KOTTKE ET AL.
	Examiner Jessica Roberts	**Art Unit** 2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on ______.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) ______ is/are withdrawn from consideration.

5)☐ Claim(s) ______ is/are allowed.

6)☒ Claim(s) *1-6,8,9 and 10* is/are rejected.

7)☒ Claim(s) *7* is/are objected to.

8)☐ Claim(s) ______ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on ______ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ______.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ______.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ______ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ______.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 9 is rejected under 35 U.S.C 101 because the claimed invention is directed to non-statutory subject matter (See USPTO Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility).

Regarding claim 9, which recites a method for entropy encoding, which falls within one of the four categories of patentable subject matter. However, taking the claimed invention as whole, the results from the method as claimed is only a manipulation of data values, i.e. abstract idea. As claimed, it does not perform any physical transformation, and/or produce a result that is useful, concrete and tangible (Interim Guidelines, Annex 5: Mathematical Algorithms).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Sharp lab of America et al., WO 98/35500 A (herein called Sharp).

4. Regarding claim 1, Sharp teaches method for fixed bit rate, intraframe compression of video (intracoded or of class intra; page 6 line 24-29), including a sequence of images (frames 1 to N; fig. 1), comprising, for each image: transforming portions of the image to generate frequency domain coefficients for each portion (fig. 2 14 & 16); selecting a quantization matrix according to the desired bit rate (Sharp, page 1 line 29-31. Further disclosed by Sharp is where wj is the jth value of a quantization matrix chosen by the designer of the MPEG codec, page 6 line 9-13.); determining a bit rate for each transformed portion using a plurality of scale factors (Sharp; See Optimization, page 9 lines 19-23 and equations 6 &7. Further, Sharp discloses the weight, variance and bits are used in determining the quantization values; see page Frame-Based Quantizater Control page 14. The examiner notes that the weight, variance and number of bits are all scale factors.); estimating distortion for each portion according to the plurality of scale factors (Sharp, page 8 equation 5); selecting a scale factor for each portion to minimize the total distortion in the image to achieve a desired bit rate (Sharp, See Optimization, page 9 line 19-23 and equations 6&7); quantizing the frequency domain coefficients for each portion using the selected quantization matrix as scaled by the selected scale factor for the portion(page 6 line 4-12 and fig. 2. Further, Sharp discloses the quantization scale and the jth coefficient of a block in quantized using a quantizer step size Qiwj and the quantization matrix is chosen by the designer of the MPEG codec, page 6 line 4-12); entropy encoding the quantized frequency domain coefficients using a variable length encoding to provide compressed data for each of the defined portions (fig. 2. Sharp discloses coding the DCT coefficients.

Although Sharp is silent in regards to the type of coding, it is inherent that entropy encoding is used with video compression in the form of Huffman, Adaptive Huffman, Run length, or variable length encoding); and outputting the compressed data for each of the defined portions to provide a compressed bitstream at the desired bit rate (fig. 2).

5. Regarding claim 2, Sharp teaches the distortion is estimated according to a square of the scale factor (Sharp, Qi^2, see equation 5, the scale factor is squared when determining the distortion).

6. Regarding claim 3, Sharp teaches wherein quantizing the frequency domain coefficients further comprises scaling using a weighting factor selected from among a plurality of weighting factors according to the bit depth of the image data (Sharp discloses where quantization controller can be used for encoding one or several frames and the parameters included for computing the quantization step size includes using the weight, variance and bits for the frame, page 14 See Frame-Based Quantization Control. The examiner notes that the coefficients are weighted by using the mentioned parameters weight, variance, and bits).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharp et al., PCT/US98/01827 and in view of Hibi et al., US-5, 724,097.

10. Regarding claim 4, Sharp is silent in regards to wherein each of the plurality of scale factors is a power of two. However, Hibi teaches where the quantization step size is given by a power of two (column 6 line 61-65, column 10 line 40-45, and fig. 13A). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method and apparatus of Sharp with the scale factor being a power of two by Hibi for providing a high efficiency encoding apparatus capable of improving image quality of blocks whose image degradation is easily perceptible to the eye (Hibi, column 10 line 25-30).

11. Regarding claim 5, the combination of Sharp and Hibi as a whole further teach wherein the selected scale factor is a power of two (Sharp discloses selecting the weights (page 16 to 10). Hibi discloses the quantization step size is given by a power of 2, column 6 line 61-65. The examiner notes that since Sharp discloses selecting the values of the weights which is a scale factor, and Hibi teaches where the quantization

step size is a factor of 2, the combination of Sharp and Hibi would be capable of having the scale factor selected to be a power of two.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sharp et al., PCT/US98/01827 and in view of Mita et al., US –5,959,675 as applied to claim 1 above, and further in view of Hibi et al., US-5,724,097.

15. Regarding claim 8, Sharp fails to teach wherein the quantization matrix includes a plurality of quantizers, wherein each quantizer corresponds to a frequency coefficient, and wherein quantizing the frequency coefficients includes quantizing each frequency coefficient using the corresponding quantizer so as to provide a deadzone having a width greater than a value of the quantizer. However, Mita discloses the quantization matrix includes a plurality of quantizers (Mita, fig. 1,6,9 and 13), wherein each quantizer

corresponds to a frequency coefficient (Mita, fig. 1. Mita discloses where the delayed DCT coefficients are linearly quantized by the first quantizers 44 and 64 using a quantizing table, column line. The examiner notes that Mita discloses using a quantization table which has the same functionality as a quantization matrix), and wherein quantizing the frequency coefficients includes quantizing each frequency coefficient using the corresponding quantizer (Mita discloses the use of a first quantizer and a second quantizer, figs 1, 6, 9, and 13. Further disclosed is the data in each block are transformed into 16 DCT coefficients by the DCT transformer 3 and then output to the field memory 22 and the second quantizer 9. Next, the data is delayed by the time corresponding to one field by the field memory 22. The delayed DCT coefficients are linearly quantized by the first quantizer 5 using a quantization table, column 9 line 57-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method and apparatus of Sharp with the teaching of Mita to increase the error resistance and adaptively improve the image quality, thereby improving the precision in controlling the code amount and the resulting image quality.

16. Sharp and Mita as a whole are silent in regards to providing a deadzone having a width greater than a value of the quantizer. However, Hibi teaches to provide a deadzone having a width greater than a value of the quantizer (Satoshi discloses that the deadzone width may have a larger or greater width than the quantized values; column 5 line and fig. 37A-37D). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method of Sharp and Mita with Hibis' deadzone teaching to provide a high efficiency encoding apparatus

capable of improving image quality of blocks whose image degradation is easily perceptible to the eye (Hibi, column 10 line 25-30).

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

18. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

19. Claim 6 and 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sharp et al., PCT/US98/01827 and in view of Lin et al., Bit-Rate Control Using Piecewise Approximated Rate Distortion Characteristics, 1998.

20. Regarding claim 6, Sharp discloses determining a maximum scale factor that will cause the image data to be completely quantized (Sharp discloses quantizer controller selects the optimal quantization value that minimize the distortion, see Optimization, page 8 to page 12. Further disclosed by Sharp is that controller selects quantizer values used for encoding N image blocks with B bits, where N could be the number of blocks in an image, part of an image, several images, or any region of the image, page 10. The

examiner notes that since the quantization controller selects the optimal quantization values, it would be capable of selecting the maximum scale factor to cause the image to be completely quantized. Further, the examiner interprets optimal and maximum to be the same). However, Sharp is silent in regards to interpolation to provide an estimated bit rate for one or more scale factors between the maximum scale factor and a largest scale factor for which a bit rate has been determined (Lin, Lin discloses using models to interpolate the rate and distortion characteristics (see Abstract). Further discloses by Lin is the encoder performs on two levels, first selecting a parameter q for each frame and one specific parameter mquant for macroblocks within the frame. Lin also discloses determining the maximum buffer size as well as a final buffer size. Lin further discloses interpolation of the rate and distortion functions, where piecewise cubic or linear interpolation is used to estimate the rate and distortion for the remaining scale factors q. See Interpolation Functions). Since Lin discloses determining the current and final bit rate as well as interpolating the rate and distortion parameters which would scale factors, the method as disclosed by Lin would be fully capable of providing an estimated bit rate for the scales factors. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method and apparatus of Sharp with the method of Lin for providing an effective rate distortion technique that aims at meeting the requirement of overflow prevention while maximizing the video quality.

21. Regarding claim 10, Sharp discloses a method for optimization of bit rate and distortion in compression of data, comprising: determining a bit rate for each portion of

the data being compressed using a plurality of scale factors (Sharp, page 7 equation 2); determining a maximum scale factor that will cause distortion to the portion of the data; (Sharp discloses the quantizer controller selects the optimal quantization values, that minimize the distortion model, see Optimization, page 8 to page 12, and equations 6&7. Further, disclosed is equations 6 & 7 generate optimized quantization values that minimize distortion for a limited number of bits, page 9 lines 19-23); estimating distortion for each portion of the data being compressed according to the plurality of scale factors (Sharp, page 8, equation 5); and selecting scale factors for each portion to minimize the total distortion of the data to achieve a desired bit rate (Sharp, page 9 line 18-23 and equations 6&7).

Sharp is silent in regards to interpolating between the maximum scale factor and largest scale factor for which a bit rate has been determined to estimate a bit rate corresponding to a scale factor between the largest scale factor and the maximum scale factor. However, Lin discloses using models to interpolate the rate and distortion characteristics (see Abstract). Further discloses by Lin is the encoder performs on two levels, first selecting a parameter q for each frame and one specific parameter mquant for macroblocks within the frame. Lin also discloses determining the maximum buffer size as well as a final buffer size. Lin further discloses interpolation of the rate and distortion functions, where piecewise cubic or linear interpolation is used to estimate the rate and distortion for the remaining scale factors q. See Interpolation Functions). Since Lin discloses determining the current and final bit rate as well as interpolating the rate and distortion parameters which would scale factors, the method as disclosed by Lin

would be fully capable of providing an estimated bit rate for the scales factors. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method and apparatus of Sharp with the method of Lin for providing an effective rate distortion technique that aims at meeting the requirement of overflow prevention while maximizing the video quality.

Allowable Subject Matter

22. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

23. The following is a statement of reasons for the indication of allowable subject matter: The present invention as claimed involves intra-frame only compression involving transforming portions of the image to generate frequency domain coefficients for each portion. The novel features include the partitioning of the quantized coefficient amplitude range where the entropy encoding comprises: for each nonzero value not preceded by a zero value, determining whether the nonzero value is in a base range or an index range; for each nonzero value not preceded by a zero value and in the base range, encoding the nonzero value using a code word from a first set of code words; for each nonzero value not preceded by a zero value and in the index range, determining an index and encoding the nonzero value using a code word from a second set of code words, followed by the index; for each nonzero value preceded by a zero value, determining whether the nonzero value is in a base range or an index range; for each

nonzero value preceded by a zero value and in the base range, encoding the nonzero value using a code word from a third set of code words and encoding the zero value using a code word from a fifth set of code words and after the code word for the nonzero value; and for each nonzero value preceded by a zero value and in the index range, determining an index and encoding the nonzero value using a code word from a fourth set of code words, followed by the index and encoding the zero value using a code word from the fifth set of code words and after the code word for the nonzero value.

24. The prior art of record fails to anticipate or render obviousness the limitations of the claimed invention where the method of entropy encoding comprises for each nonzero value not preceded by a zero value, determining whether the nonzero value is in a base range or an index range; for each nonzero value not preceded by a zero value and in the base range, encoding the nonzero value using a code word from a first set of code words; for each nonzero value not preceded by a zero value and in the index range, determining an index and encoding the nonzero value using a code word from a second set of code words, followed by the index; for each nonzero value preceded by a zero value, determining whether the nonzero value is in a base range or an index range; for each nonzero value preceded by a zero value and in the base range, encoding the nonzero value using a code word from a third set of code words and encoding the zero value using a code word from a fifth set of code words and after the code word for the nonzero value; and for each nonzero value preceded by a zero value and in the index range, determining an index and encoding the nonzero value using a code word from a

fourth set of code words, followed by the index and encoding the zero value using a code word from the fifth set of code words and after the code word for the nonzero value.

Conclusion

25. The referenced citations made in the rejection(s) above are intended to exemplify areas in the prior art document(s) in which the examiner believed are the most relevant to the claimed subject matter. However, it is incumbent upon the applicant to analyze the prior art document(s) in its/their entirety since other areas of the document(s) may be relied upon at a later time to substantiate examiner's rationale of record. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). However, "the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed...." In re Fulton, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

26. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Zeng et al., US-20040062448-- Distortion-adaptive visual frequency weighting

Ramaswamy, et al., US-20020163966 – Video coding method and apparatus

Werner et al., US-6, 668,088 B1 – Digital signal compression encoding with improved quantization

Bist et al., US- 6,249,546 B1 Adaptive entropy encoding in adaptive quantization framework for video signal systems and processes

Zhu et al., US-5,821,887 A – Variable length decoding method of coded bit stream in computer system- involves executing run length decoding

Shimizu et al., US-6,438,167 B1— Code amount control device and encoding apparatus using the same

Peters et al., US –6,687,407 B2 -- Quantization table adjustment

Peters et al., US- 6,023,531A – Compression methods adjusting quality during image capture- allows user to scale values in quantizing table specifying frequency bands to be filtered when quantizing

CONTACT

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica Roberts whose telephone number is (571) 270-1821. The examiner can normally be reached on 7:30-5:00 EST Monday-Friday, Alt Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jessica M. Roberts/
09-17-2007

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TC 2600